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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/608,281	Applicant(s) HARRES, DANIEL N.	
	Examiner Li Liu	Art Unit 2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 July 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5,7-21,23-29,31-35 and 37-43* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,7-21,23-29,31-35 and 37-43* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 July 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *7/25/2007*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-5, 7-21,.23-29, 31-35 and 37-43 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's argument – "Nakmao does not teach "compare the calculated noise with a threshold" because Nakano teaches comparing voltages to one another. Therefore, Applicant respectfully requests reconsideration mad withdrawal of the rejection to claim 1."

Examiner's response – Arnon teaches to calculate the noise level and use the calculation to control the gain of the APD; therefore, a reference value or threshold must have been used in Arnon's system so to make a decision to adjust the gain. Nakano discloses a feedback control circuit (Figure 1 and 2), which uses a reference voltage to control the gain of the APD. And Nakano also teaches "[t]he alarm circuit 7 receives the noise detection signal 105, counts the noise pulses generated within a predetermined period, and outputs an alarm pulse 107 when the number of the counted noise pulses reaches a **preset value**. When the level of the optical signal input to the APD 2 is lowered or becomes zero, the APD 2 increases the amplification factor of the optical signal based on the control signal from the feedback control circuit 4".

The threshold is "a level, point, or value above which something is true or will take place and below which it is not or will not". Therefore, it is obvious to one skilled in the art that the reference voltage is a threshold value since the comparator compares the output from the detector with the reference voltage; and based on the comparison, a

control signal is output to control the APD. And also as mentioned above, Nakano et al teaches a preset value which is a threshold value too.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-4, 7, 32-34 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arnon et al (US 2002/0114038) in view of Nakano (US 6,795,675).

1). With regard to claim 1, Arnon et al discloses an apparatus (Figure 3), comprising:

a receiver (Avalanche Photodiode 150 in Figure 3) configured to receive an optical signal and to convert the optical signal to a corresponding electrical signal; and

a control circuit (the Detector 154 and Controller 156 in Figure 3) coupled to the receiver, the control circuit including a monitoring component (Detector 154 in Figure 3) configured to calculate a noise level of at least a portion of the electrical signal (the monitoring signal is part of the electrical signal split from the output of amplifier 152, Figure 3; the gain of the APD is set according to the optical power level, the background noise level, and the aggregate noise, page 10-11, [0237]-[0239]) and to adjust a gain of the receiver based on the noise level (page 10-11, [0237]-[0239], the gain of the APD is

set according to the optical power level, the background noise level, and the aggregate noise).

But, Arnon does not expressly state to compare the noise level with a threshold value. However, since Arnon teaches to calculate the noise level and use the calculation to control the gain of the APD, it is obvious that a reference value or threshold must have been used in Arnon's system to make a decision to adjust the gain. Another prior art, Nakano, discloses a feedback control circuit (Figures 1 and 2), which uses a reference voltage/threshold to control the gain of the APD. And Nakano also teaches "[t]he alarm circuit 7 receives the noise detection signal 105, counts the noise pulses generated within a predetermined period, and outputs an alarm pulse 107 when the number of the counted noise pulses reaches a preset value. When the level of the optical signal input to the APD 2 is lowered or becomes zero, the APD 2 increases the amplification factor of the optical signal based on the control signal from the feedback control circuit 4".

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply a threshold value in the system of Arnon et al so that the gain of the APD can be better controlled and the signal quality can be improved.

2). With regard to claim 2, Arnon et al and Nakano disclose all of the subject matter as applied to claim 1 above. And Arnon et al further discloses a transmitter (e.g., Figure 4, the emitter 52) configured to transmit the optical signal to the receiver.

3). With regard to claim 3, Arnon et al and Nakano disclose all of the subject matter as applied to claim 1 above. And Arnon et al further discloses wherein the

monitoring component is further configured to adjust an amplification of the transmitter (the Power Attenuator 49 sets a power output of emitter 52 in Figure 4) based on the noise level (page 11, [0241]-[0243]).

4). With regard to claim 4, Arnon et al and Nakano disclose all of the subject matter as applied to claim 1 above. And Arnon et al further discloses wherein the receiver includes a photodiode (Figure 3, the Avalanche Photodiode 150).

5). With regard to claim 7, Arnon et al and Nakano disclose all of the subject matter as applied to claim 1 above. And Arnon et al further discloses wherein the monitoring component includes a noise energy calculation component configured to calculate a calculated noise level of at least a portion of the electrical signal (page 10-11, [0237]-[0239], the noise level and aggregate noise are calculated).

9). With regard to claim 32, Arnon et al disclose a method of controlling an output of an optical system, comprising:

receiving an optical signal with a receiver (Avalanche Photodiode 150 receives optical signal, Figure 3);

converting the optical signal to a corresponding electrical signal (Avalanche Photodiode 150 converts optical signal into an electrical signal, Figure 3);

calculating (the Detector 154 and Controller 156 in Figure 3; the gain of the APD is set according to the optical power level, the background noise level, and the aggregate noise, page 10-11, [0237]-[0239]) a noise level of at least a portion of the electrical signal; and

adjusting at least one of an amplification of the optical signal and a gain of the receiver based on the noise level (page 10-11, [0237]-[0239], the gain of the APD is set according to the optical power level, the background noise level, and the aggregate noise).

But, Arnon does not expressly state to compare the noise level with a threshold value. However, since Arnon teaches to calculate the noise level and use the calculation to control the gain of the APD, it is obvious that a reference value or threshold must have been used in Arnon's system to make a decision to adjust the gain. Another prior art, Nakano, discloses a feedback control circuit (Figures 1 and 2), which uses a reference voltage/threshold to control the gain of the APD. And Nakano also teaches "[t]he alarm circuit 7 receives the noise detection signal 105, counts the noise pulses generated within a predetermined period, and outputs an alarm pulse 107 when the number of the counted noise pulses reaches a preset value. When the level of the optical signal input to the APD 2 is lowered or becomes zero, the APD 2 increases the amplification factor of the optical signal based on the control signal from the feedback control circuit 4".

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply a threshold value in the system of Arnon et al so that the gain of the APD can be better controlled and the signal quality can be improved.

10). With regard to claim 33, Arnon et al and Nakano disclose all of the subject matter as applied to claim 32 above. And Arnon et al further discloses the method

further including transmitting (e.g., Figure 4, the emitter 52) the optical signal to the receiver (Figure 4).

11). With regard to claim 34, Arnon et al and Nakano disclose all of the subject matter as applied to claim 32 above. And Arnon et al further discloses wherein receiving an optical signal with a receiver includes receiving an optical signal with a photodiode (Figure 3, the Avalanche Photodiode 150).

12). With regard to claim 38, Arnon et al and Nakano disclose all of the subject matter as applied to claim 32 above. And Arnon et al further discloses wherein monitoring a noise level of at least a portion of the electrical signal includes calculating a noise energy level of at least a portion of the electrical signal (page 10-11, [0237]-[0239], the noise level and aggregate noise are calculated).

4. Claims 16, 18-21 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arnon et al (US 2002/0114038) in view of Harres (US 6,128,112) and Saunders (US 6,259,542) and Nakano (US 6,795,675).

1). With regard to claim 16, Arnon et al discloses an optical system, comprising:

a transmitter (e.g., Figure 4, the emitter 52) configured to transmit an optical signal;

a receiver (Avalanche Photodiode 150 in Figure 3) configured to receive the optical signal and to output an electrical signal; and

a monitoring component (the Detector 154 and Controller 156 in Figure 3) configured to monitor a noise level of at least a portion of the electrical signal (the monitoring signal is part of the electrical signal split from the output of amplifier 152,

Figure 3) and to adjust at least one of an amplification of the transmitter and a gain of the receiver based on the noise level (page 10-11, [0237]-[0239], the gain of the APD is set according to the optical power level, the background noise level, and the aggregate noise).

Arnon et al disclose wherein the monitoring component is configured to reduce at least one of an amplification of the transmitter and a gain of the receiver (page 10-11, [0237]-[0239], the gain of the APD is set according to the optical power level, the background noise level, and the aggregate noise).

But, Arnon et al does not expressly disclose the amplification of the transmitter or the gain is adjusted when a ratio of an average energy of a high-state A of the electrical signal and an average energy of a low-state A of the electrical signal is greater than a predetermined threshold.

However, Harres discloses a high energy calculation component configured to compute average energys for the high-state and low state (column 3 line 2-33), and power determining means for determining the power of the respective noise portions of the two phase segments (Figure 3). And Harres teaches that the signal-to-noise ratio is used for calculating weight factor. And another prior art, Saunders uses a ratio between a detected energy level of a soliton pulses and a detected energy level of the dispersive wave for controlling the gain of an amplifier (Figures 3 and 4, column 5, line 48-58, column 6 line 26-37, and column 7, line 31-49); and a reference value or threshold is used in Saunders' system to make decision as to whether the control device should be activated (column 9, line 26-37). Therefore, it would have been obvious to one of

ordinary skill in the art at the time the invention was made to use the ratio of the average energies for the high- and low-states to control the gain of the APD.

And Nakano discloses a feedback control circuit (Figures 1 and 2), which uses a reference voltage/or predetermined threshold to control the gain of the APD.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the ratio of the energy states and a comparator and a predetermined threshold as taught by Harres and Saunders and Nakano to the system of Arnon et al so that the gain is adjusted when a ratio of an average energy of a high-state of the electrical signal and an average energy of a low-state of the electrical signal is greater than a predetermined threshold, and then the gain of the APD can be better controlled and the signal quality can be improved.

2). With regard to claim 18, Arnon et al and Harres and Saunders and Nakano disclose all of the subject matter as applied to claim 16 above. And Arnon et al further discloses wherein the receiver includes an avalanche photodiode (Figure 3, the Avalanche Photodiode 150).

3). With regard to claim 19, Arnon et al and Harres and Saunders and Nakano disclose all of the subject matter as applied to claim 16 above. And Arnon et al further disclose wherein the monitoring component is configured to monitor an output voltage of the electrical signal and to adjust at least one of an amplification of the transmitter and a gain of the receiver (page 10-11, [0237]-[0239]).

But, Arnon et al does not teach to adjust the gain to maintain a desired RMS level of the electrical signal.

However, to use the RMS as a criterion to make an automatic control is a well known technique, Harres discloses a system and method to maintain a desired RMS level of a electrical signal (column 10, line 11-28).

Harres provides a reliable detection and decoding method even at low power levels. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the RMS as taught by Harres to the system of Arnon et al so that the gain of the APD can be better controlled and the signal quality can be improved.

4). With regard to claim 20, Arnon et al and Harres and Saunders and Nakano disclose all of the subject matter as applied to claim 16 above. And Arnon et al further discloses wherein the monitoring component includes a noise energy calculation component configured to calculate a calculated noise level of at least a portion of the electrical signal (page 10-11, [0237]-[0239], the noise level and aggregate noise are calculated).

5). With regard to claim 21, Arnon et al and Harres and Saunders and Nakano disclose all of the subject matter as applied to claim 16 above. But, Arnon et al does not expressly disclose wherein the monitoring component includes: a high energy calculation component configured to compute an average energy for the high-state A; a low energy calculation component configured to compute an average energy for the low-state -A; and a comparator configured to compare a ratio of the average energies for the high- and low-states A, -A with a predetermined threshold.

However, Harres discloses a high energy calculation component configured to compute average energys for the high-state and low state (column 3 line 2-33), and power determining means for determining the power of the respective noise portions of the two phase segments (Figure 3). And Harres teaches that the signal-to-noise ratio is used for calculating weight factor. And another prior art, Saunders uses a ratio between a detected energy level of a soliton pulses and a detected energy level of the dispersive wave for controlling the gain of an amplifier (Figures 3 and 4, column 5, line 48-58, column 6 line 26-37, and column 7, line 31-49). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the ratio of the average energies for the high- and low-states to control the gain of the APD.

And Nakano discloses a feedback control circuit (Figures 1 and 2), which uses a reference voltage/or predetermined threshold to control the gain of the APD.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the ratio of the energy states and a comparator and a predetermined threshold as taught by Harres and Saunders and Nakano to the system of Arnon et al so that the gain of the APD can be better controlled and the signal quality can be improved.

6). With regard to claim 23, Arnon et al and Harres and Saunders and Nakano disclose all of the subject matter as applied to claim 16 above. But Arnon et al does not expressly disclose wherein the monitoring component includes: a condition determining component configured to determine at least one of a presence or an absence of light at the receiver; a state means calculation component configured to compute at least one

of a high state means and a low state means of the electrical signal; a high energy calculation component configured to compute an average energy for the high-state A; a low energy calculation component configured to compute an average energy for the low-state -A; and a comparator configured to compare a ratio of the average energies for the high- and low-states A, -A with a predetermined threshold.

However, Harres et al discloses a method and system wherein the monitoring component includes: a condition determining component (column 3 line 2-33, and Figure 3) configured to determine at least one of a presence or an absence of light at the receiver (Figure 3, the condition determining component determines the states of the signal: high state and low state); a state means calculation component configured to compute at least one of a high state means and a low state means of the electrical signal (Figure 3, the state means calculate power of the signals at high and low states); a high energy calculation component configured to compute an average energy for the high-state A (34 in Figure 3); a low energy calculation component configured to compute an average energy for the low-state –A (36 in Figure 3).

Harres teaches that the signal-to-noise ratio is used for calculating weight factor. And another prior art, Saunders uses a ratio between a detected energy level of a soliton pulses and a detected energy level of the dispersive wave for controlling the gain of an amplifier (Figures 3 and 4, column 5, line 48-58, column 6 line 26-37, and column 7, line 31-49). Also, Nakano, discloses a feedback control circuit (Figures 1 and 2), which uses a reference voltage/threshold to be compared and then to control the gain of the APD.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a comparator and a predetermined threshold to the system of Arnon et al so that comparator to compare a ratio of the average energies for the high- and low-states with a predetermined threshold, and then the gain of the APD can be better controlled and the signal quality can be improved

5. Claims 5, 8-12, 35, 39 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arnon et al (US 2002/0114038) and Nakano (US 6,795,675) as applied to claims 1 and 32, and in further view of Harres (US 6,128,112).

1). With regard to claims 5 and 35, Arnon et al and Nakano discloses all of the subject matter as applied to claims 1 and 32 above. And Arnon et al further disclose wherein the monitoring component is configured to monitor an output voltage of the electrical signal and to adjust at least one of an amplification of the transmitter and a gain of the receiver (page 10-11, [0237]-[0239]).

But, Arnon et al does not teach to adjust the gain to maintain a desired RMS level of the electrical signal.

However, to use the RMS as a criterion to make an automatic control is a well known technique, Harres discloses a system and method to maintain a desired RMS level of a electrical signal (column 10, line 11-28).

Harres provides a reliable detection and decoding method even at low power levels. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the RMS as taught by Harres to the system of

Arnon et al and Nakano so that the gain of the APD can be better controlled and the signal quality can be improved.

2). With regard to claims 8 and 39, Arnon et al and Nakano disclose all of the subject matter as applied to claims 1, 7, 32 and 38 above. But, Arnon et al does not expressly disclose wherein the noise energy calculation component includes an integrate-and-dump circuit that integrates an energy value over a bit interval.

However, Harres et al discloses a method and system in which the noise energy calculation component includes an integrate-and-dump circuit that integrates an energy value over a bit interval (column 7, line 3-23, and Figure 3).

Harres provides a reliable detection and decoding method even at low power levels. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the techniques of noise calculation as taught by Harres to the system of Arnon et al and Nakano so that the gain of the APD can be better controlled and the signal quality can be improved.

3). With regard to claims 9 and 40, Arnon et al and Nakano disclose all of the subject matter as applied to claims 1, 7, 8, 32 and 38 above. But, Arnon et al does not expressly disclose wherein the noise energy calculation component includes a subtractor component that receives a state indicator signal and subtracts a high-state +A or a low-state -A state from the electrical signal based on the state indicator signal.

However, Harres discloses a subtractor (column 10 line 20), a state indicator (column 3 line 2-33), the state indicator determines the states or phase of the optical signal: light (or high) and dark (or low) portions; and power determining means for

determining the power of the respective noise portions of the two phase segments (Figure 3).

As disclosed by Arnon et al, the level measured by detector 154 is an average level, the type and parameters of the averaging being set by CPU 81. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the subtractor and state indicator as taught by Harres to the system of Arnon et al so that the noise energy calculation component includes a subtractor component that receives a state indicator signal and subtracts a high-state or a low-state from the electrical signal based on the state indicator signal, and then the gain of the APD can be better controlled and the signal quality can be improved.

4). With regard to claim 10, Arnon et al and Nakano disclose all of the subject matter as applied to claims 1 and 7-9 above. But, Arnon et al does not expressly disclose wherein the noise energy calculation component includes a squaring function that squares an output from the subtractor component and transmits the squared output to the integrate-and-dump circuit.

However, a squaring function that squares an output is well known in the art, Harres discloses a system and method in which the energy calculation component includes a squaring function that squares an output (column 7, line 3-31).

Harres provides a reliable detection and decoding method even at low power levels. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the RMS as taught by Harres to the system of

Arnon et al so that the gain of the APD can be better controlled and the signal quality can be improved.

5). With regard to claim 11, Arnon et al and Nakano disclose all of the subject matter as applied to claim 1 above. But, Arnon et al does not expressly disclose wherein the monitoring component includes a condition determining component configured to determine at least one of a presence or an absence of light at the receiver.

However, Harres discloses a condition determining component configured to determine at least one of a presence or an absence of light at the receiver (column 3 line 2-33, and Figure 3), the condition determining component determines the states of the signal: high state and low state; and power determining means for determining the power of the respective noise portions of the two phase segments.

Harres provides a reliable detection and decoding method even at low power levels. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the condition determining component as taught by Harres to the system of Arnon et al so that the gain of the APD can be better controlled and the signal quality can be improved.

6). With regard to claim 12, Arnon et al and Nakano disclose all of the subject matter as applied to claim 1 above. But, Arnon et al does not expressly disclose wherein the monitoring component includes a state means calculation component configured to compute at least one of a high state means and a low state means of the electrical signal.

However, Harres discloses a state means calculation component configured to compute at least one of a high state means and a low state means of the electrical signal (column 3 line 2-33, and Figure 3); and power determining means for determining the power of the respective noise portions of the two phase segments.

Harres provides a reliable detection and decoding method even at low power levels. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the state means calculation component as taught by Harres to the system of Arnon et al so that the gain of the APD can be better controlled and the signal quality can be improved.

6. Claims 13-15 and 41-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arnon et al (US 2002/0114038) and Nakano (US 6,795,675) as applied to claims 1 and 32 above, and in further view of Harres (US 6,128,112) and Saunders (US 6,259,542).

1). With regard to claims 13 and 41, Arnon et al and Nakano disclose all of the subject matter as applied to claims 1 and 32 above. But, Arnon et al does not expressly disclose wherein the monitoring component includes: a high energy calculation component configured to compute an average energy for the high-state A; a low energy calculation component configured to compute an average energy for the low-state -A; and a comparator configured to compare a ratio of the average energies for the high- and low-states A, -A with a predetermined threshold.

However, Harres discloses a high energy calculation component configured to compute average energys for the high-state and low state (column 3 line 2-33), and

power determining means for determining the power of the respective noise portions of the two phase segments (Figure 3). And Harres teaches that the signal-to-noise ratio is used for calculating weight factor. And another prior art, Saunders uses a ratio between a detected energy level of a soliton pulses and a detected energy level of the dispersive wave for controlling the gain of an amplifier (Figures 3 and 4, column 5, line 48-58, column 6 line 26-37, and column 7, line 31-49). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the ratio of the average energies for the high- and low-states to control the gain of the APD.

And Nakano discloses a feedback control circuit (Figures 1 and 2), which uses a reference voltage/or predetermined threshold to control the gain of the APD.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the ratio of the energy states and a comparator and a predetermined threshold as taught by Harres and Saunders and Nakano to the system of Arnon et al and Nakano so that the gain of the APD can be better controlled and the signal quality can be improved.

2). With regard to claims 14 and 42, Arnon et al and Nakano disclose all of the subject matter as applied to claims 1, 16 and 32 above. And Arnon et al disclose wherein the monitoring component is configured to reduce at least one of an amplification of the transmitter and a gain of the receiver (page 10-11, [0237]-[0239], the gain of the APD is set according to the optical power level, the background noise level, and the aggregate noise).

Arnon et al does not expressly disclose the gain is adjusted when a ratio of an average energy of a high-state A of the electrical signal and an average energy of a low-state A of the electrical signal is greater than a predetermined threshold.

However, Harres discloses a high energy calculation component configured to compute average energys for the high-state and low state (column 3 line 2-33), and power determining means for determining the power of the respective noise portions of the two phase segments (Figure 3). And Harres teaches that the signal-to-noise ratio is used for calculating weight factor. And another prior art, Saunders uses a ratio between a detected energy level of a soliton pulses and a detected energy level of the dispersive wave for controlling the gain of an amplifier (Figures 3 and 4, column 5, line 48-58, column 6 line 26-37, and column 7, line 31-49). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the ratio of the average energies for the high- and low-states to control the gain of the APD.

And Nakano discloses a feedback control circuit (Figures 1 and 2), which uses a reference voltage/or predetermined threshold to control the gain of the APD.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the ratio of the energy states and a comparator and a predetermined threshold as taught by Harres and Saunders and Nakano to the system of Arnon et al and Nakano so that the gain is adjusted when a ratio of an average energy of a high-state of the electrical signal and an average energy of a low-state of the electrical signal is greater than a predetermined threshold, and then the gain of the APD can be better controlled and the signal quality can be improved.

3). With regard to claims 15 and 43, Arnon et al and Nakano disclose all of the subject matter as applied to claims 1 and 32 above. But Arnon et al does not expressly disclose wherein the monitoring component includes: a condition determining component configured to determine at least one of a presence or an absence of light at the receiver; a state means calculation component configured to compute at least one of a high state means and a low state means of the electrical signal; a high energy calculation component configured to compute an average energy for the high-state A; a low energy calculation component configured to compute an average energy for the low-state -A; and a comparator configured to compare a ratio of the average energies for the high- and low-states A, -A with a predetermined threshold.

However, Harres et al discloses a method and system wherein the monitoring component includes: a condition determining component (column 3 line 2-33, and Figure 3) configured to determine at least one of a presence or an absence of light at the receiver (Figure 3, the condition determining component determines the states of the signal: high state and low state); a state means calculation component configured to compute at least one of a high state means and a low state means of the electrical signal (Figure 3, the state means calculate power of the signals at high and low states); a high energy calculation component configured to compute an average energy for the high-state A (34 in Figure 3); a low energy calculation component configured to compute an average energy for the low-state –A (36 in Figure 3).

And Harres teaches that the signal-to-noise ratio is used for calculating weight factor. And another prior art, Saunders uses a ratio between a detected energy level of

a soliton pulses and a detected energy level of the dispersive wave for controlling the gain of an amplifier (Figures 3 and 4, column 5, line 48-58, column 6 line 26-37, and column 7, line 31-49). Also, Nakano, discloses a feedback control circuit (Figures 1 and 2), which uses a reference voltage/threshold to be compared and then to control the gain of the APD.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a comparator and a predetermined threshold to the system of Arnon et al so that comparator to compare a ratio of the average energies for the high- and low-states with a predetermined threshold, and then the gain of the APD can be better controlled and the signal quality can be improved.

7. Claim 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arnon et al (US 2002/0114038) and Nakano (US 6,795,675) as applied to claim 32 above, and in further view of Traa (US 6,222,660).

Arnon et al and Nakano discloses all of the subject matter as applied to claim 32 above. And Arnon et al further discloses wherein receiving an optical signal with a receiver includes receiving an optical signal with an avalanche photodiode (Figure 3, APD 158).

But, Arnon does not expressly disclose wherein comparing the calculated noise level with a threshold value includes comparing the calculated noise level with a breakdown threshold of the avalanche photodiode.

However, Nakano, discloses a feedback control circuit (Figures 1 and 2), which uses a reference voltage/threshold to be compared and then to control the gain of the

APD. And another prior art, Traa, teaches a breakdown threshold of the avalanche photodiode (Figure 2, the point 48, column 3, line 17-21) so to control the bias voltage from the adaptive power supply.

Arnon teaches to calculate the noise level and use the calculation to control the gain of the APD, a reference value or threshold must have been used in Arnon's system to make a decision to adjust the gain. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply a threshold value or breakdown threshold as taught by Nakano and Traa to the system of Arnon et al so that comparing the calculated noise level with a threshold value includes comparing the calculated noise level with a breakdown threshold of the avalanche photodiode; and then the gain of the APD can be better controlled and the signal quality can be improved.

8. Claims 24, 26-29 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arnon et al (US 2002/0114038) in view of Hall et al (US 6,577,419) Harres (US 6,128,112) and Saunders (US 6,259,542) and Nakano (US 6,795,675).

1). With regard to claim 24, Arnon et al discloses an optical system (Figures 2 and 3) configured to transmit signals, the optical system including, comprising:

a transmitter (e.g., Figure 4, the emitter 52) configured to transmit an optical signal; and

a receiver (Avalanche Photodiode 150 in Figure 3) configured to receive the optical signal and to output an electrical signal; and

a monitoring component (the Detector 154 and Controller 156 in Figure 3) configured to monitor a noise level of at least a portion of the electrical signal (the monitoring signal is part of the electrical signal split from the output of amplifier 152, Figure 3) and to adjust at least one of an amplification of the transmitter and a gain of the receiver based on the noise level (page 10-11, [0237]-[0239], the gain of the APD is set according to the optical power level, the background noise level, and the aggregate noise).

But, Arnon et al does not disclose (A) a vehicle, comprising: a fuselage and a propulsion system operatively coupled to the fuselage; and the optical system is used in the vehicle; (B) the amplification of the transmitter or the gain is adjusted when a ratio of an average energy of a high-state A of the electrical signal and an average energy of a low-state A of the electrical signal is greater than a predetermined threshold.

With regard to item (A), however, Hall et al discloses an aircraft (the aircraft comprises inherently the fuselage and propulsion system operatively coupled to the fuselage) and the fiber optics including the transmitter, receiver and APD are installed in the aircraft (Figure 1, column 4, line 19-39 and column 5, line 6-8).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the feedback system as taught by Arnon et al to the aircraft so that the gain of the APD can be better controlled and the signal quality can be improved.

With regard to item (B), however, Harres discloses a high energy calculation component configured to compute average energys for the high-state and low state

(column 3 line 2-33), and power determining means for determining the power of the respective noise portions of the two phase segments (Figure 3). And Harres teaches that the signal-to-noise ratio is used for calculating weight factor.

And another prior art, Saunders uses a ratio between a detected energy level of a soliton pulses and a detected energy level of the dispersive wave for controlling the gain of an amplifier (Figures 3 and 4, column 5, line 48-58, column 6 line 26-37, and column 7, line 31-49); and a reference value or threshold is used in Saunders' system to make decision as to whether the control device should be activated (column 9, line 26-37). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the ratio of the average energies for the high- and low-states to control the gain of the APD.

And Nakano discloses a feedback control circuit (Figures 1 and 2), which uses a reference voltage/or predetermined threshold to control the gain of the APD.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the ratio of the energy states and a comparator and a predetermined threshold as taught by Harres and Saunders and Nakano to the system of Arnon et al and Hall et al so that the gain is adjusted when a ratio of an average energy of a high-state of the electrical signal and an average energy of a low-state of the electrical signal is greater than a predetermined threshold, and then the gain of the APD can be better controlled and the signal quality can be improved.

2). With regard to claim 26, Arnon et al and Hall et al and Harres and Saunders and Nakano disclose all of the subject matter as applied to claims 24 above. And Arnon

et al further discloses wherein the receiver includes an avalanche photodiode (Figure 3, the Avalanche Photodiode 150).

3). With regard to claim 27, Arnon et al and Hall et al and Harres and Saunders and Nakano disclose all of the subject matter as applied to claim 24 above. And Arnon et al further disclose wherein the monitoring component is configured to monitor an output voltage of the electrical signal and to adjust at least one of an amplification of the transmitter and a gain of the receiver (page 10-11, [0237]-[0239]).

But, Arnon et al does not teach to adjust the gain to maintain a desired RMS level of the electrical signal.

However, to use the RMS as a criterion to make an automatic control is a well known technique, Harres discloses a system and method to maintain a desired RMS level of a electrical signal (column 10, line 11-28).

Harres provides a reliable detection and decoding method even at low power levels. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the RMS as taught by Harres to the system of Arnon et al so that the gain of the APD can be better controlled and the signal quality can be improved.

4). With regard to claim 28, Arnon et al and Hall et al and Harres and Saunders and Nakano disclose all of the subject matter as applied to claims 24 above. And Arnon et al further discloses wherein the monitoring component includes a noise energy calculation component configured to calculate a calculated noise level of at least a

portion of the electrical signal (page 10-11, [0237]-[0239], the noise level and aggregate noise are calculated).

5). With regard to claim 29, Arnon et al and Hall et al and Harres and Saunders and Nakano disclose all of the subject matter as applied to claim 24 above. But, Arnon et al does not expressly disclose wherein the monitoring component includes: a high energy calculation component configured to compute an average energy for the high-state A; a low energy calculation component configured to compute an average energy for the low-state -A; and a comparator configured to compare a ratio of the average energies for the high- and low-states A, -A with a predetermined threshold.

However, Harres discloses a high energy calculation component configured to compute average energys for the high-state and low state (column 3 line 2-33), and power determining means for determining the power of the respective noise portions of the two phase segments (Figure 3). And Harres teaches that the signal-to-noise ratio is used for calculating weight factor. And another prior art, Saunders uses a ratio between a detected energy level of a soliton pulses and a detected energy level of the dispersive wave for controlling the gain of an amplifier (Figures 3 and 4, column 5, line 48-58, column 6 line 26-37, and column 7, line 31-49); and a reference value or threshold is used in Saunders' system to make decision as to whether the control device should be activated (column 9, line 26-37). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the ratio of the average energies for the high- and low-states to control the gain of the APD.

And Nakano discloses a feedback control circuit (Figures 1 and 2), which uses a reference voltage/or predetermined threshold to control the gain of the APD.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to to apply the ratio of the energy states and a comparator and a predetermined threshold as taught by Harres and Saunders and Nakano to the system of Arnon et al and Hall so that the gain of the APD can be better controlled and the signal quality can be improved.

6). With regard to claim 31, Arnon et al and Hall et al and Harres and Saunders and Nakano disclose all of the subject matter as applied to claim 24 above. But Arnon et al does not expressly disclose wherein the monitoring component includes: a condition determining component configured to determine at least one of a presence or an absence of light at the receiver; a state means calculation component configured to compute at least one of a high state means and a low state means of the electrical signal; a high energy calculation component configured to compute an average energy for the high-state A; a low energy calculation component configured to compute an average energy for the low-state -A; and a comparator configured to compare a ratio of the average energies for the high- and low-states A, -A with a predetermined threshold.

However, Harres et al discloses a method and system wherein the monitoring component includes: a condition determining component (column 3 line 2-33, and Figure 3) configured to determine at least one of a presence or an absence of light at the receiver (Figure 3, the condition determining component determines the states of the signal: high state and low state); a state means calculation component configured to

compute at least one of a high state means and a low state means of the electrical signal (Figure 3, the state means calculate power of the signals at high and low states); a high energy calculation component configured to compute an average energy for the high-state A (34 in Figure 3); a low energy calculation component configured to compute an average energy for the low-state –A (36 in Figure 3).

And Harres teaches that the signal-to-noise ratio is used for calculating weight factor. And another prior art, Saunders uses a ratio between a detected energy level of a soliton pulses and a detected energy level of the dispersive wave for controlling the gain of an amplifier (Figures 3 and 4, column 5, line 48-58, column 6 line 26-37, and column 7, line 31-49); and a reference value or threshold is used in Saunders' system to make decision as to whether the control device should be activated (column 9, line 26-37). Also, Nakano, discloses a feedback control circuit (Figures 1 and 2), which uses a reference voltage/threshold to be compared and then to control the gain of the APD.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the ratio of the energy states and a comparator and a predetermined threshold as taught by Harres and Saunders and Nakano to the system of Arnon et al and Hall so that comparator to compare a ratio of the average energies for the high- and low-states with a predetermined threshold, and then the gain of the APD can be better controlled and the signal quality can be improved.

9. Claims 17, 25 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arnon et al and Hall and Harres and Saunders and Nakano as applied to claims 16 and 24 above, and in further view of Tomooka et al (US 6,266,169).

Arnon et al and discloses and all of the subject matter as applied to claims 16 and 24 above. But Arnon et al does not expressly teach wherein the transmitter includes an optical amplifier.

However, Tomooka et al discloses a transmitter including an optical amplifier (Figure 1, the optical amplifier 14 or 2). The optical amplifier is a well known device in the optical communications, Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a optical amplifier in the system of Arnon et al so that the required input optical power can be obtained, and noise can be better controlled and the signal quality can be improved.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Pulics (US 5,270,533) discloses a stabilization biasing circuit for APD for aircraft.

Glance et al (US 5,907,569) discloses a control circuit for photodiode.

Urala (US 4,805,236) discloses a bias control for photodiode.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Li Liu whose telephone number is (571)270-1084. The examiner can normally be reached on Mon-Fri, 8:00 am - 5:30 pm, alternating Fri off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Vanderpuye can be reached on (571)272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Li Liu
September 25, 2007

KENNETH VANDERPUYE
SUPERVISORY PATENT EXAMINER